SR 101 Corridor Improvement Feasibility Study

draft statement of purpose and need

prepared for

Indiana Department of Transportation

prepared by

Cambridge Systematics, Inc.

with

Bernardin, Lochmueller & Associates, Inc.
Dyer Environmental Services

January 2002

prepared for

Indiana Department of Transportation

January 2002

draft statement of purpose and need

SR 101 Corridor Improvement Feasibility Study

prepared by

Cambridge Systematics, Inc.
150 Cambridge Park Drive, Suite 4000
Cambridge, Massachusetts 02140

Table of Contents

List of Tables

List of Figures

1.0 Summary of Study Purpose

The SR 101 Corridor Improvement Feasibility Study has been undertaken by the Indiana Department of Transportation to assess the implications of limited north-south access in the SR 101 study area and to identify feasible improvement alternatives. Based on an assessment of purpose and need, discussed in the following sections of this memorandum, study goals include the following:

- Improve roadway safety and reduce accident frequency in the study area; and
- Address perceptions of inadequate regional accessibility and connectivity, and if perceptions prove valid, improve regional accessibility and connectivity.

Indiana State Route 101 (SR 101) is a rural two-lane roadway that runs north-south in disconnected segments along the eastern border of Indiana, from Dekalb County in northern Indiana to Switzerland County in the south, approximately the entire length of the state. Because of its lack of continuity, its ability to effectively serve north-south vehicular movement in eastern Indiana is limited. This is a particular problem affecting accessibility for counties located in the southeastern part of the state, south of I-74.[1] These counties include Dearborn, Ohio, Switzerland, Ripley, and Jefferson.

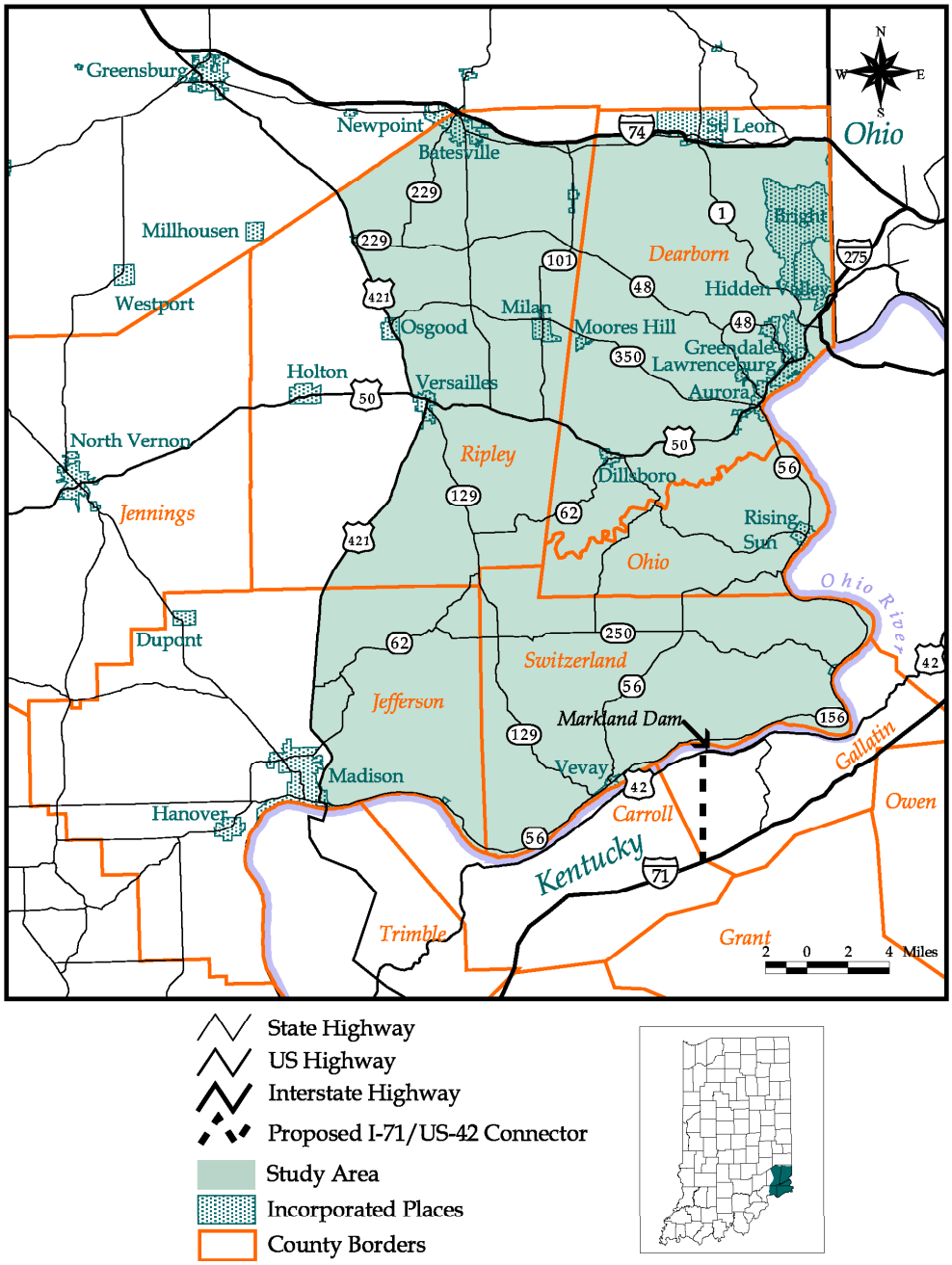
Figure 1.1 shows the SR 101 corridor study area and its major roadways. Within this area, SR 101 runs for approximately 17 miles between I-74 in the north to U.S. 50 in the south. From this southern terminus, there is an approximate 25-mile gap in the roadway to a short segment of SR 101 over the Markland Dam Bridge on the Ohio River between Indiana and Kentucky. A new roadway, currently under construction in Kentucky, will provide a direct connection from the Markland Dam to I-71 which runs east-west, south of the study area.

Due to its largely rural character and low-density, traffic congestion and roadway capacity, historically, have not been a significant concern in the SR 101 corridor. However, north-south travel through the area must rely on circuitous, winding two-lane roadways. The area's hilly terrain further impedes travel, creating difficult driving conditions in poor weather and slow response to emergencies. It is apparent that these conditions may be

[1] North of I-74, north-south movement is facilitated by SR 1 From Angola to Lawrenceburg and I-69 from the Michigan border to Indianapolis.

contributing to a higher than average rate of traffic accidents on local roadways and added travel delay and inconvenience, particularly for commercial vehicle operations. This overall lack of accessibility and connectivity to the major metropolitan areas of Indianapolis, Cincinnati, and Louisville may also be an impediment to the region's economic growth and development.

Figure 1.1 SR 101 Study Area



2.0 Study Background

This section of the Statement of Purpose and Need provides information used in the assessment of the purpose and need for improvements to the SR 101 corridor. Included is a description of overall roadway conditions, current and forecasted future traffic volumes, and proposed roadway improvements within the study area. Also included is a discussion of local economic conditions, and historical activities and developments which have a bearing on traffic and transportation needs in the SR 101 corridor. These include the 1990 Roadway Analysis of SR 101 and SR 129, development of gambling casinos along the Ohio River, and growth in employment and development of new roadways in Northern Kentucky.

2.1 Study Area Description

2.1.1 Study Area Location and Roadways[1]

As shown in Figure 1.1, the study area is located in southeastern Indiana and includes all of Ohio and Switzerland Counties, all of Dearborn County south of Interstate 74, and Ripley and Jefferson Counties east of U.S. 421.

Major roadways within the study area include:

- U.S. 50 – U.S. 50 is classified as a "rural principal arterial" and is part of the National Highway System (NHS). It passes through south-central Indiana and links the study area to Cincinnati on the east and I-65 near Seymour on the west. Except for I-74 on the northern edge of the study area, and I-71 to the south of the study area in Kentucky, U.S. 50 is the only route with east-west continuity through the study area.

- U.S. 421 – U.S. 421 is a "rural principal arterial" and is also on the NHS. It links Madison in Jefferson County to I-74 at Greensburg. It forms the western edge of the study area and is the only route within the study area with north-south continuity.

[1] Detailed information on study area roadways is contained in the Existing Conditions Report for the SR 101 Corridor Improvement Feasibility Study, prepared for INDOT by Bernardin, Lochmueller & Associates, Cambridge Systematics, Inc., and Dyer Environmental Services, May 2001.

- SR 129 – SR 129 is classified as a "rural minor arterial" from I-74 to U.S. 50 in Ripley County and a "rural major collector" from U.S. 50 and S.R. 56 for the balance of the route in Ripley County and Switzerland County. It is the only route in the study area east of U.S. 421 that passes through the entire north-south length of the study area. However, SR 129 lacks continuity and requires use of U.S. 50 near Versailles for approximately two miles in order to travel north-south the length of the study area.

- SR 56 and SR 62 – SR 56 and SR 62 are east-west "rural major collectors" in the southern portion of the study area, linking Madison, Dillsboro, and Lawrenceburg. Both routes meander in terms of their predominant orientation and involve diversions onto other routes.

Overall, about 90 percent of the roadways in the study area have two lanes. The quality of traffic flow is influenced by the number of lanes. Conditions on a two-lane roadway (one lane each direction) can prevent opportunities to pass other vehicles and maintain a constant travel speed. The remaining 10 percent of area roadways have four travel lanes. These roadways include I-74 and U.S. 50 between SR 101 and Lawrenceburg. In Madison, U.S. 421 also has four lanes. A short six-lane section of U.S. 50 exists in Lawrenceburg near the I-275 connector.

Another indicator of roadway operating quality is the number of curves per mile. More than one curve per mile with severe operating speed restrictions may be cause for concern, as drivers experience a more difficult time controlling their speed and maneuvering safely on the roadway. In part, due to the particularly hilly terrain of southeastern Indiana, three routes in the study area exhibit a rate of one curve/mile or higher over an extended stretch of the route. SR 129 in Switzerland County between SR 56 in Vevay and SR 250, has over one curve per mile over a 15-mile stretch of roadway. This section of roadway was identified in the 1990 SR 101 Corridor Study for reconstruction to eliminate many of the curves, thus improving mobility along this corridor. SR 62 between Dillsboro and SR 129 has over 1.5 curves per mile over a 16-mile stretch. There are sharp curves along this section and trucks reportedly avoid using this roadway. Finally, SR 56 within Ohio and Switzerland Counties has approximately one curve per mile over a 30-mile length of road between Vevay and the border between Ohio and Dearborn Counties.

2.1.2 Traffic Volumes – Existing and Future[2]

Existing Conditions

Table 2.1 shows the 1998 daily traffic volumes on the major roadways and the estimated peak-period level-of-service (LOS) or volume-to-capacity ratio (v/c) derived from the regional travel demand model. Analysis indicates that about 90 percent of the roadway miles in the study area carry less than 10,000 vehicles per day (vpd). The highest daily volumes, greater than 25,000 vpd, are along sections of I-74 at the northern boundary of the study area and I-275 east of Lawrenceburg near the Ohio and Kentucky state borders. These sections represent two percent of the study area roadways and, because they are located at or near the study area boundaries, are not a major influence on the travel patterns within the core of the study area.

Two indicators of the quality of traffic flow along a roadway are the level-of-service (LOS) and the volume-to-capacity (v/c) ratio. Roadways are rated on a level-of-service scale of A through F based on the speed and the freedom to maneuver (percent time spent following the vehicle). LOS A reflects the ability to achieve the posted speed and complete freedom to change lanes or pass other cars. LOS F represents stop-and-go flow with no freedom to maneuver. LOS C is considered desirable for rural areas. The volume-to-capacity (v/c) ratio compares the actual volume to maximum volume (capacity) that could pass a point over time. The more congested the roadway, the closer the v/c ratio is to 1.0. LOS E equals a v/c ratio of 1.0. Based on output from the model for the study area, about 95 percent of the roadway miles within the study area are currently operating with a peak period at a LOS C or better (a v/c ratio of 0.60 or lower), indicating few traffic congestion issues. The roadway sections which do have a LOS below "C" (v/c greater than 0.60) are located within more densely developed areas of Lawrenceburg, Madison, and Versailles.

On average, truck volumes within the region represent about five to 10 percent of the overall traffic flow. Higher truck percentages, closer to 15 percent, occur in Lawrenceburg and Madison. The highest truck volumes in the region occur along I-74, with truck percentages of 15 to 20 percent. These truck percentages are considered standard for these types of roadways and the volume of truck movements within the study area have not been identified as a concern. Slow moving trucks can be a significant traffic issue, however, when they travel at reduced speeds along two-lane roads and prevent other traffic from traveling at desired speeds.

[2] Detailed information on traffic volumes can be found in the Existing Conditions Report, cited previously.

Table 2.1 Existing (1998) Roadway Volumes

Major Roadway	Year 1998 Daily Volumes	Year 1998 P.M. Period V/C	LOS
I-74			
Between Batesville and Ohio state border	19,000 – 25,000	0.20 – 0.35	B
I-275			
East of Lawrenceburg, near Ohio border	18,000 – 33,000	0.30 – 0.50	C
U.S. 50			
Between Ripley/Jennings County Line and Versailles	7,000 – 9,000	0.25 – 0.50	B
Between Versailles and Aurora	7,000 – 14,000	0.10 – 0.70	C
Between Aurora and Lawrenceburg	33,000	0.60 – 0.80	D
U.S. 421			
Between Madison and Versailles	4,000 – 5,000	0.15 – 0.40	B
Between Versailles and Greensburg	4,000 – 6,000	0.15 – 0.35	B
SR 129			
Between Vevay and U.S. 50	500 – 1,000	0.05 – 0.20	A
Between U.S. 50 and SR 46	2,000 – 7,000	0.10 – 0.35	B
SR 56			
Between Madison and Vevay	2,000 – 4,000	0.10 – 0.20	A
Between Vevay and U.S. 156 south of Rising Sun	500 – 1,500	0.05 – 0.30	B
Between Rising Sun and Aurora	5,000 – 7,000	0.25 – 0.40	B
SR 62			
Between Madison and SR 129	100 – 500	0.05 – 0.15	A
Between SR 129 and Dillsboro	500	0.05 – 0.15	A

Source: Cambridge Systematics, Inc. SR 101 Regional Travel Demand Model.

Future Conditions

As summarized in Table 2.2, all roadways will experience some increase in daily traffic volumes over the next 25 years. Within the SR 101 study area, daily vehicle miles of travel (VMT) are projected to grow 28 percent between 1998 and 2025. However, about 93 percent of roadway miles will continue to experience a LOS of "C" or better (a v/c ratio less than 0.60), indicating no emerging congestion problems. As is the case under existing conditions, some roadways in Lawrenceburg, Madison and Versailles will continue to experience a LOS below "C" and v/c rates over 0.60, indicating some localized congestion concerns.

Based on the travel model forecasts for the region, truck percentages on most roadways will generally remain in the five to 10 percent range. Along U.S. 50 in Ripley and Dearborn counties, truck percentages will increase from 10 percent under current conditions to 15 percent in the future. Rates of 15 percent will continue to occur in Lawrenceburg and Madison. Along I-74, trucks are expected to represent 20 to 25 percent of the traffic flow.

Table 2.2 Future (2025) Roadway Volumes

Major Roadway	Year 2025 Daily Volumes	Year 2025 P.M. Period V/C	LOS
I-74			
Between Greensburg and the Ohio state border	25,000 – 30,000	0.25 – 0.35	B
I-275			
East of Lawrenceburg, near Ohio border	28,000 – 45,000	0.55 – 0.70	C
U.S. 50			
Between Ripley/Jennings County Line and Versailles	7,000 – 10,000	0.30 – 0.50	B
Between Versailles and Aurora	7,000 – 16,000	0.15 – 0.70	C
Between Aurora and Lawrenceburg	45,000	0.80 – 0.90	E
U.S. 421			
Between Madison and Versailles	5,000 – 6,000	0.15 – 0.55	C
Between Versailles and Greensburg	7,000 – 10,000	0.40 – 0.60	C
SR 129			
Between Vevay and U.S. 50	3,000 – 4,000	0.15 – 0.30	B
Between U.S. 50 and SR 46	3,000 – 7,000	0.15 – 0.50	B
SR 56			
Between Madison and Vevay	3,000 – 4,000	0.15 – 0.20	A
Between Vevay and U.S. 156 south of Rising Sun	2,000 – 4,000	0.10 – 0.60	C
Between Rising Sun and Aurora	7,000 – 10,000	0.25 - 0.45	B
SR 62			
Between Madison and SR 129	500 – 1,000	0.05 – 0.15	A
Between SR 129 and Dillsboro	500	0.05 – 0.15	A

Source: Cambridge Systematics, Inc. SR 101 Regional Travel Demand Model.

2.1.3 Planned Improvements[3]

Various roadway improvements are currently in progress or are scheduled for future completion that will benefit travel conditions within the SR 101 corridor study area. In response to the recommendations of the 1990 SR 101/SR 129 Corridor Study discussed in Section 2.3, reconstruction of SR 129 from SR 250 south to SR 56 near Vevay is programmed for the 2003 construction year (INDOT project designation #9802690). This work will include improved vertical and horizontal alignments as well as widened lanes and shoulders. (SR 129 from SR 250 to U.S. 421 was resurfaced in 2000.)

Additional programmed improvements of specific relevance to the SR 101 corridor include:

- SR 48 in Dearborn County (from Wilson Creek Road to U.S. 50) – Additional travel lanes scheduled for 2001 (INDOT project designation #8910926; #941092W; and, #9600920);
- SR 1 in Dearborn County (from U.S. 50 to SR 46) – Roadway reconstruction scheduled for 2006 (INDOT project designation #9804710);
- SR 56 in Jefferson County (from U.S. 421 to SR 129 in Vevay) – Roadway reconstruction scheduled for 2005 (INDOT project designation #0014680); and
- SR 56 in Ohio and Dearborn Counties (from Rising Sun to Aurora) – Roadway reconstruction scheduled for 2004 (INDOT project designation #9902520).

In addition to these programmed improvements, there is one significant "planned" project within the study area, meaning that there is no established construction letting date at the present time. This project involves reconstruction of U.S. 50 in Ripley and Jennings Counties from North Vernon to SR 101 in Ripley County.

■ 2.2 Local Economic Conditions

The SR 101 study area is predominantly rural with only a few areas of concentrated development, including Versailles, Lawrenceburg and Aurora, and Madison. For the most part, development is sparse and recent growth

[3] Detailed information on planned improvements can be found in the Existing Conditions Report, cited previously.

in employment opportunities has been limited to jobs in the Service Sector generated by the development of gambling casinos and their adjacent hotels. The future of the region's economy has been a concern expressed by many local citizens, public officials and business leaders. Accessibility is seen by these individuals as a key consideration in the enhancement of economic opportunities and encouragement of new development.

The Service Industry, which includes casino and hotel employment, was the primary employment sector for all study area counties in 1998 with the exception of Ripley and Switzerland. Only Ripley County had a dominant share of employment (31.2 percent) in the manufacturing sector. Switzerland County's dominant employment sector was Farming and Agricultural Services (26.4 percent), although employment in this sector is frequently supported by a second source of income. Employment projections for 2025 indicate that the Service Sector share of employment in all study area counties will continue to grow. While 26.1 percent of 1998 study area employment was in Services, this sector's share of employment is projected to increase to 34.1 percent in 2025; whereas the Agriculture Sector, particularly in Switzerland County, and Manufacturing Sector are projected to decline in regional share. In terms of per capita income, the SR 101 study area lags significantly behind the state of Indiana as a whole. In 1998, the average per capita income of the five-county study area was $18,600, approximately 13.5 percent below the statewide average. This disparity is projected to increase in 2025 to be 16.6 percent below the statewide average.

Corroborating the issue of economic development in Southeastern Indiana is the recent United States Department of Agriculture's annual Strategic Plan for rural development in Indiana.[4] The USDA identified certain rural counties in Indiana as "stressed," meaning that the area was having difficulty in being "successful and sustainable." Eleven factors were used in this evaluation, including housing-related infrastructure, population change, household income, employment, healthcare, and business growth. Out of 92 Indiana counties, Switzerland County ranked as the fourth most stressed. Of the 11 ranking factors, Switzerland County was among the top 20 highest need counties for five factors and the top 10 highest need counties for three factors, including persons living in poverty.

Alternatives selected for detailed analysis to address the specific transportation needs of the SR 101 Study Area will also be assessed for their potential economic development benefits. This will involve application of the Major Corridor Investment-Benefit Analysis System (MCIBAS) to selected alternatives. MCIBAS was developed for INDOT as a system for assessing the relative costs and benefits of proposed major highway corridor projects.

[4] USDA Rural Development Strategic Plan for Indiana, Revised January, 2001.

The economic impact analysis component of MCIBAS facilitates the evaluation of the effects of a given project on the economy of the state and subregions. MCIBAS distinguishes four types of economic impacts:

- Construction impacts – primarily short-term effects of purchasing materials and hiring workers for highway construction.
- Business expansion – primarily long-term economic effects of reducing highway travel-related costs for businesses.
- Business attraction – long-term economic effects on industrial operations beyond travel cost savings, such as more efficient inventory and logistics management, implementation of just-in-time production processes, and customer market expansion.
- Tourism impacts – long-term economic effects on tourism markets, primarily regional effects on tourism patterns due to expanded market access.

Assessment of these impacts will be based on the relative change effected from no-build conditions to identify which alternative produces most favorable economic impacts such as business attraction and employment.

2.3 1990 SR 101/SR 129 Corridor Study

In October 1990, the Indiana Department of Transportation (INDOT) conducted a roadway analysis to determine viable options for an improved north/south corridor from the SR 101 Markland Dam Bridge on the Ohio River to U.S. 50 in southeastern Indiana through Switzerland and Ohio Counties.[5] The analysis was performed at the request of INDOT's Seymour District Office in response to requests from various sources, including the County Commissioners of Switzerland and Ohio Counties and U.S. Representative Lee Hamilton.

Two improvement options were identified for analysis. One option was an 18-mile alignment for a "new" state road corridor that would utilize 2.5 miles of existing SR 56 and 15.5 miles of existing county road corridors to connect SR 101 at the Markland Dam Bridge north to U.S. 50 in the vicinity of U.S. 50 intersection with SR 101. Construction cost for this project was estimated between $42.5 million and $50.2 million. The alignment of the

[5] Indiana Department of Transportation, Programming Section, "Roadway Analysis: SR 101 Road Construction from Markland to U.S. 50 and SR 129 Road Reconstruction from SR 56 to U.S. 421," October 1990.

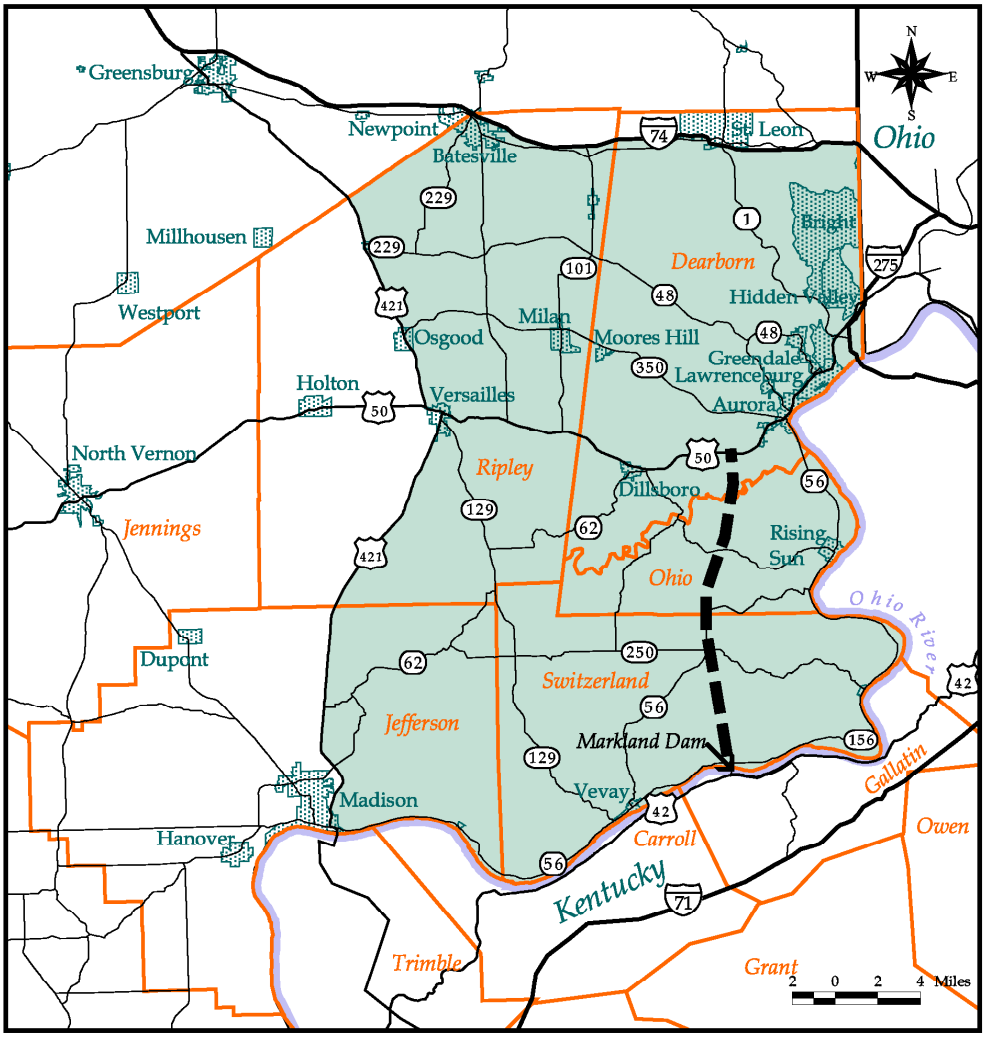
"new" corridor analyzed in this study is shown in Figure 2.1. The second option involved the reconstruction of SR 129 from SR 56 near Vevay to U.S. 421 south of Versailles. The analysis determined that due to the extremely hilly terrain within the area, several vertical and horizontal curves would need improvement. The cost of reconstructing the southern segment of the SR 129 corridor between SR 56 and SR 250 was estimated to be $12.4 million and the northern segment between SR 250 and U.S. 421 was estimated to be $3.7 million.

The analysis determined that a new roadway from Markland Dam to U.S. 50 was not as cost-effective as the reconstruction of SR 129. Given the amount of traffic which estimated at the time to utilize a new roadway, the $42.5 to $50.2 million cost of construction was comparatively high relative to similar projects. It was also determined that the level-of-service on existing SR 129 was acceptable due to low traffic volumes. However, it was also determined that a mobility problem was apparent on the southern segment of the SR 129 corridor due to geometric deficiencies that slowed traffic. The study concluded that reconstruction of the roadway would improve mobility by eliminating undesirable vertical and horizontal curves. Resurfacing of the northern segment of SR 129 (SR 250 to U.S. 421) was completed in 2000. Reconstruction of the southern segment (SR 250 to SR 56) is scheduled to begin in 2003.

2.4 Casino Development

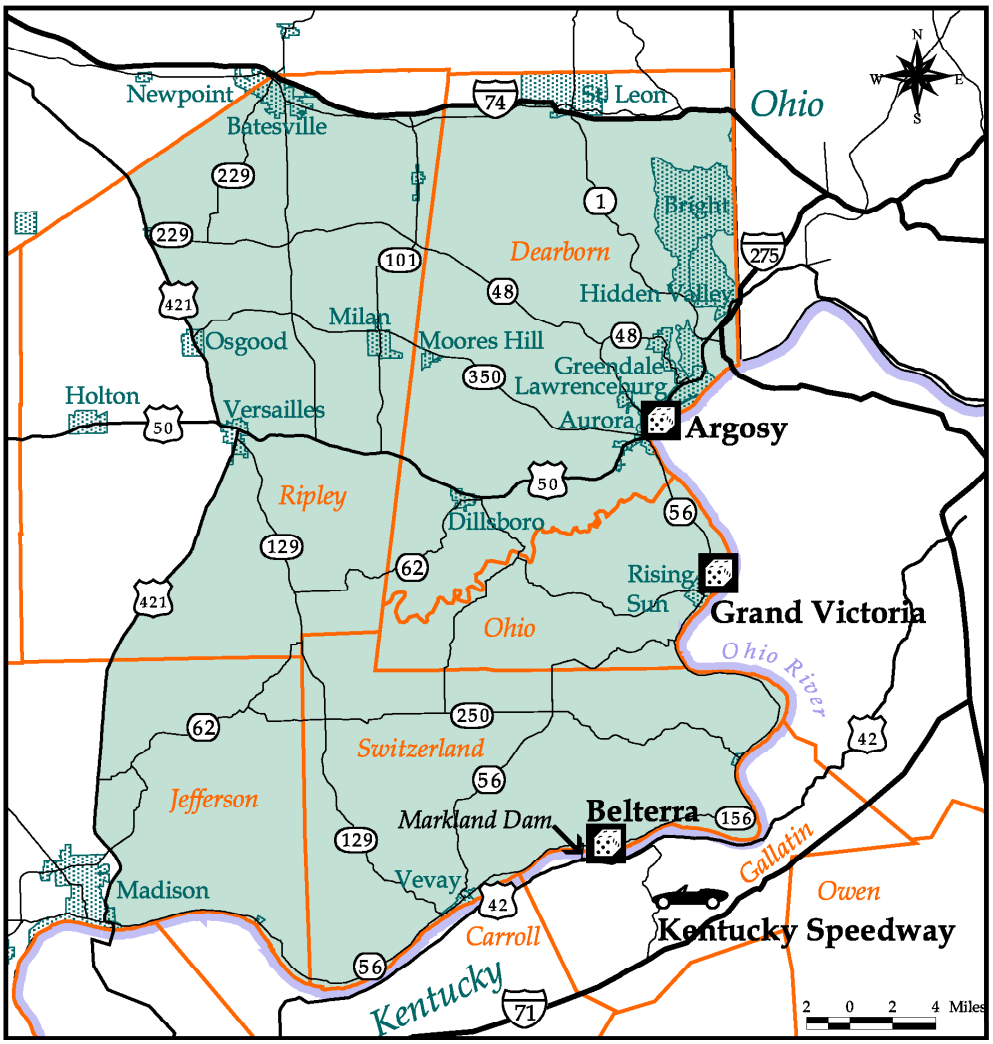
Since the completion of the 1990 SR 101 Corridor Study, the most significant change in the SR 101 study area affecting travel demand has been the development of three riverboat casinos on the Ohio River. The Indiana Riverboat Gambling Act, which became effective July 1, 1993, legalized casino gaming on riverboats. This legislation permitted the licensing of 11 riverboats, of which five were authorized for the Ohio River. As shown in Figure 2.2, three of these Ohio River riverboat casinos are located in the SR 101 study area. Both the Argosy Casino in Lawrenceburg and the Grand Victoria Casino in Rising Sun opened for business in 1996. The third casino, Belterra, opened near Vevay in 2000. Each of these facilities operates from 9:00 a.m. until the late evening-early morning hours, seven days a week. Each facility includes a hotel with 200 to 300 rooms. Both the Grand Victoria and Belterra also have 18-hole golf courses. In total, these three casinos and associated hotel and resort developments employ approximately 5,000 people, equal to about 20 percent of the total employment of Switzerland, Ohio, and Dearborn counties.

Figure 2.1 1990 SR 101/SR 129 Study Analysis Corridor



State Highway
US Highway
Interstate Highway
1990 Analysis Corridor
Study Area
Incorporated Places
County Borders

Figure 2.2 Location of Study Area Casinos and Kentucky Speedway



In 2000, admissions to the Argosy were 3.1 million and to the Grand Victoria were 1.4 million. The Belterra, which opened in October 2000, had 175,000 admissions for the remainder of 2000. It is estimated that the Argosy generates about 10,000 average daily vehicle trips (5,000 in and 5,000 out) and the Grand Victoria generates about 5,000 average daily vehicle trips (2,500 in and 2,500 out). Annual admission data is not yet available from the Belterra. Because it is similar in size to the Grand Victoria, it is estimated that the Belterra will generate a comparable number of trips as the Grand Victoria.

Patronage at these facilities is drawn from the region at-large, encompassing the metropolitan areas of Columbus, Cincinnati, Dayton, Louisville, and Indianapolis. For each of these facilities, accessibility was

cited in interviews with casino operators as a critical concern, particularly in regard to the ability of these facilities to compete with facilities located closer to major urban areas with more direct highway access.

2.5 Northern Kentucky Growth and KYTC Plans

Further contributing to travel demand through the SR 101 study area is the economic development of Carroll and Gallatin Counties in northern Kentucky, directly south of the study area. The largest of these manufacturing facilities are located in Carroll County and include Gallatin Steel, Dow Corning, and North American Stainless. Since 1990, Carroll and Gallatin Counties have experienced a combined employment growth of 33 percent, as compared to 22 percent employment growth for the five Indiana counties in the SR 101 study area. A substantial number of employees of facilities in northern Kentucky commute to work from southern Indiana.

Another traffic generator in northern Kentucky is the Kentucky Speedway in Sparta, Kentucky, near the Markland Dam and I-71 in Gallatin County as shown in Figure 2.2. This facility opened in 2000. In its current phase of development, the facility has 65,989 grandstand seats, additional luxury suites, and a 2,000-seat exterior club. Expansion of the facility in Phase II would involve the addition of a dirt track and drag-strip racing facilities with grandstand seating capacity of 120,000. The limited summer race schedule for 2001 includes four weekends from June through August with multiple events each weekend, beginning on Friday through Saturday or Sunday. Also, large arena rock concerts are periodically held at the facility. As a result of its intermittent schedule of events, the facility is not a consistent trip generator. However, when in operation, the facility draws spectators from throughout a multi-state region.

Two projects are being undertaken by the Kentucky Transportation Cabinet (KYTC) which would facilitate access in Gallatin and Carroll Counties. The first involves the construction of a new roadway between I-71 to U.S. 42 in the vicinity of the Markland Dam. This project has advanced through the design stage and is currently under construction. This will be a two-lane facility providing a direct connection between I-71 and the Markland Dam with access to the Kentucky Speedway, as indicated in Figure 1.1. A second project, for which a conceptual feasibility study is currently being conducted, is a northern Kentucky outer loop which could involve an I-74 Bypass for a corridor across northern Kentucky from Markland Dam to the Maysville Dam east of Cincinnati. The proposed I-74 corridor will be approximately 80 miles long. (Locating the specific corridor is an initial element of the feasibility study's work

plan.) This project was identified as a "high-priority project" in the Federal Transportation Equity Act for the 21st Century (TEA-21). By improving access into the vicinity of Markland Dam, both of these facilities have potential in increase travel demand in the SR 101 study area. As a result, coordination of activities on the various studies has been established with the Kentucky Transportation Cabinet and will be maintained during the SR 101 corridor study.

3.0 Purpose and Need

3.1 Improve Roadway Safety

An analysis of accidents throughout the five-county study area was performed using INDOT accident data from 1996 to 1998. These data were used to assess personal injury and fatality rates within the study area compared to the state of Indiana as a whole. Tables 3.1 and 3.2 and Figures 3.1 and 3.2 summarize these accident statistics. Table 3.1 and Figure 3.1 provide statistics for all rural arterial roadways which have either an injury rate or fatality rate higher than the state average for comparable facilities. Table 3.2 and Figure 3.2 provide these statistics for rural collector roadways.

These statistics provide an indication of the specific problem roadways at the county level. For example, from 1996 to 1998, SR 56 in Switzerland County, a rural arterial roadway, had an injury rate of 187.8 and a fatality rate of 9.4 per 100 million annual vehicle miles of travel. In contrast, statewide, Indiana rural arterial roadways had an average injury rate of 50.4 and a fatality rate of 2.1. Thus, the injury and fatality rates on SR 56 in Switzerland County were 273 percent and 348 percent above the state average, respectively, for comparable roadways. Injury rates on rural collector roadways in the study area were also found to significantly exceed state averages. Statewide from 1996 to 1998, Indiana rural collector roadways had an average injury rate of 90.6 and a fatality rate of 1.3. SR 262 in Ohio County exceeded the state average injury rate for comparable roadways by 102 percent. SR 129 in Switzerland County exceeded the state average injury rate by 85 percent and the state average fatality rate by 362 percent. Excluding U.S. 421 in Jefferson and Ripley Counties and SR 156 in Switzerland County, all of the state rural arterial roadways in the Study area had higher injury rates than the state as a whole. Furthermore, all of the rural arterial roadways in the study area had higher fatality rates than the statewide average, excluding U.S. 50 and SR 56 in Dearborn County, U.S. 421 in Jefferson and Ripley Counties, and SR 156 in Ohio County.

Table 3.3 summarizes injury and fatality rates on State Arterial and Collector Roadways by county. As indicated in the table, both Dearborn and Switzerland Counties had injury rates higher than the 1996 to 1998 state average, and all study area counties with the exception of Dearborn County had fatality rates equal to or higher than the state average. This problem is particularly evident in Switzerland County which had an

injury rate 36 percent higher and a fatality rate 335 percent higher than the state average.

Figure 3.1 Injury and Fatality Rates for Rural Arterial Roadways

Rate(s) Above State Average

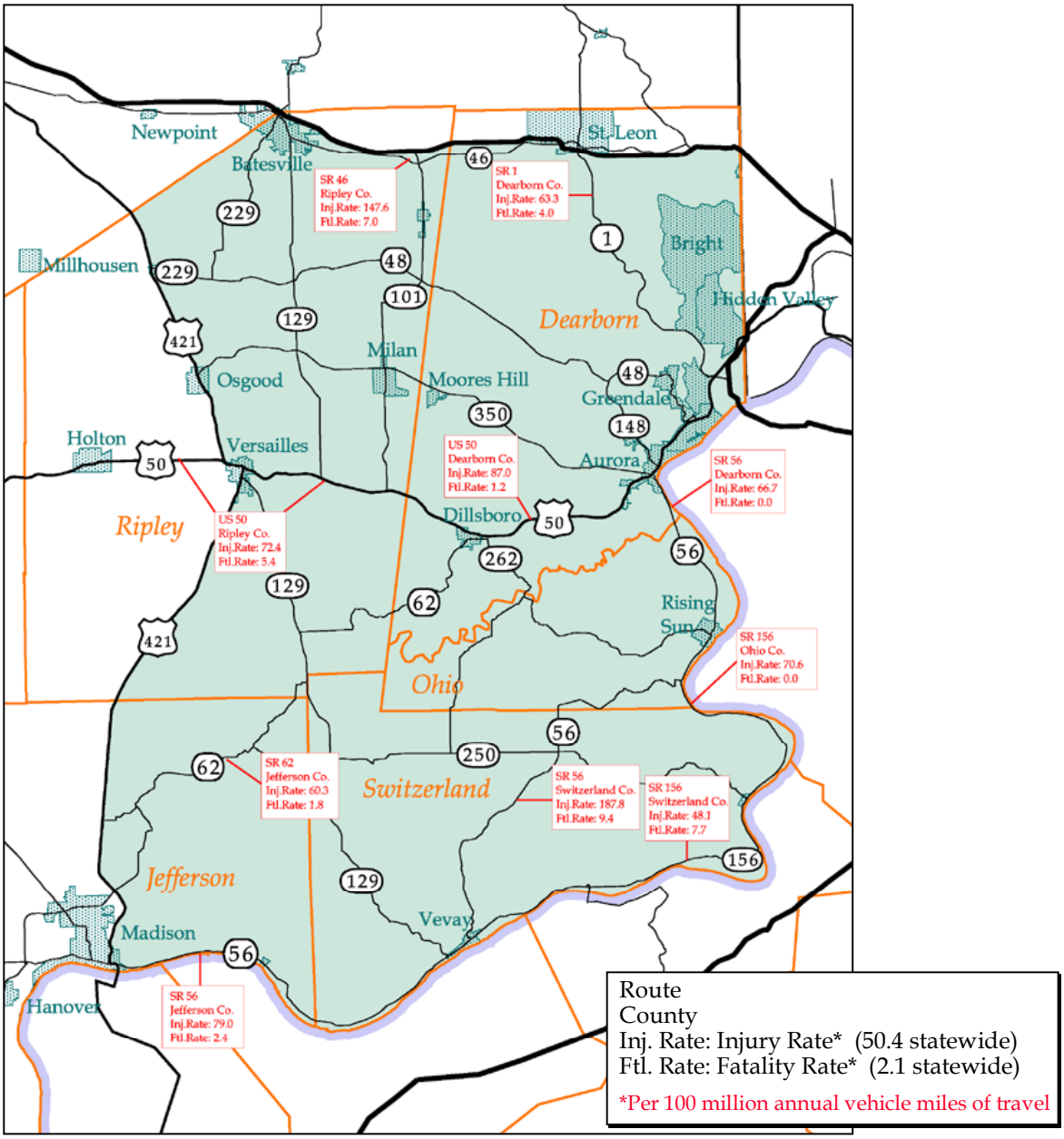


Figure 3.2 Injury and Fatality Rates for Rural Collector Roadways

Rate(s) Above State Average

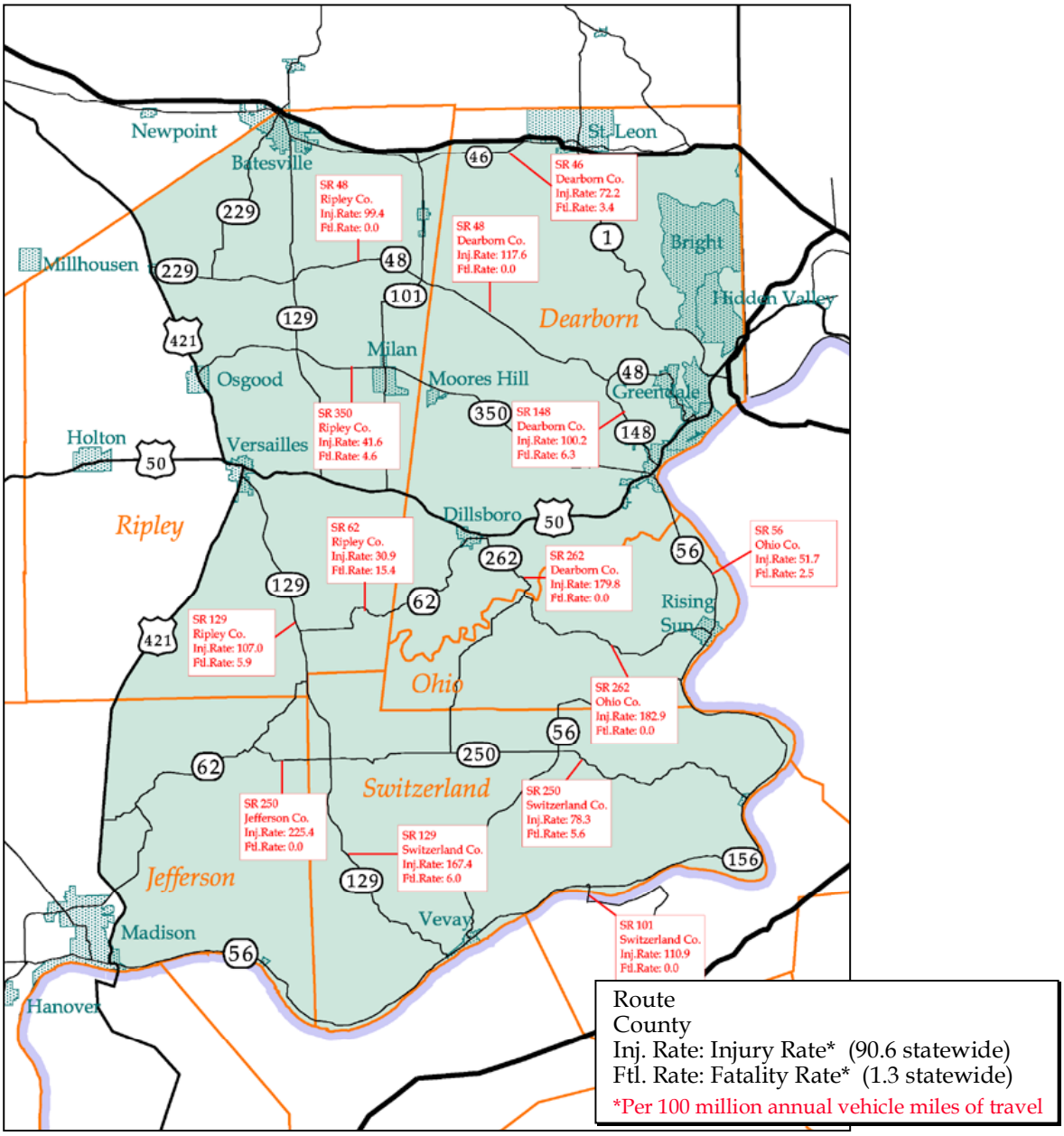


Table 3.1 Accident Rates for State Rural Arterial Roadways in S.R. 101 Study Area Locations with Injury and/or Fatality Rates Higher than State Average

Route	County	Daily VMT	Injuries (1996-1998)	Fatalities (1996-1998)	Injury Rate*	Fatality Rate*
U.S. 50	Ripley	111,607	80	6	**72.4**	**5.4**
U.S. 50	Dearborn	348,381	300	4	**87.0**	1.2
S.R. 1	Dearborn	100,536	63	4	**63.3**	**4.0**
S.R. 46	Ripley	14,367	21	1	**147.6**	**7.0**
S.R. 56	Jefferson	126,562	99	3	**79.0**	**2.4**
S.R. 56	Switzerland	21,511	40	2	**187.8**	**9.4**
S.R. 56	Dearborn	30,282	20	0	**66.7**	0.0
S.R. 62	Jefferson	167,458	100	3	**60.3**	1.8
S.R. 156	Switzerland	52,505	25	4	48.1	**7.7**
S.R. 156	Ohio	4,291	3	0	**70.6**	0.0
Other Principal and Minor Arterials	Indiana Statewide	31,627,273	15,780	659	50.4	2.1

Source: Bernardin-Lochmueller & Associates, Inc. from INDOT data.

Notes: * Per 100 million annual vehicle miles of travel. Rates higher than statewide average shown in bold.

Table 3.2 Accident Rates for State Rural Collector Roadways in S.R. 101 Study Area Locations with Injury and/or Fatality Rates Higher than State Average

Route	County	Daily VMT	Injuries (1996-1998)	Fatalities (1996-1998)	Injury Rate*	Fatality Rate*
S.R. 46	Dearborn	29,395	21	1	72.2	**3.4**
S.R. 48	Dearborn	66,144	77	0	**117.6**	0.0
S.R. 148	Dearborn	16,131	16	1	**100.2**	**6.3**
S.R. 262	Dearborn	5,056	9	0	**179.8**	0.0
S.R. 250	Jefferson	9,860	22	0	**225.4**	0.0
S.R. 56	Ohio	80,066	41	2	51.7	**2.5**
S.R. 262	Ohio	9,942	18	0	**182.9**	0.0
S.R. 48	Ripley	18,297	18	0	**99.4**	0.0
S.R. 62	Ripley	6,541	2	1	30.9	**15.4**
S.R. 129	Ripley	16,997	18	1	**107.0**	**5.9**
S.R. 350	Ripley	43,656	18	2	41.6	**4.6**
S.R. 101	Switzerland	911	1	0	**110.9**	0.0
S.R. 129	Switzerland	16,899	28	1	**167.4**	**6.0**
S.R. 250	Switzerland	18,068	14	1	78.3	**5.6**
All Collectors	Indiana Statewide	41,501,010	37,242	538	90.6	1.3

Source: Bernardin-Lochmueller & Associates, Inc. from INDOT data.

Notes: * Per 100 million annual vehicle miles of travel. Rates higher than statewide average shown in bold.

Table 3.3 Summary of Injury and Fatality Rates on State Arterial and Collector Roadways

County/State	Daily VMT	Injuries (1996-1998)	Fatalities (1996-1998)	Injury Rate*	Fatality Rate*
Dearborn	683,884	567	11	83.7	1.6
Jefferson	422,786	249	7	59.5	1.7
Ohio	94,299	62	2	66.4	2.1
Ripley	400,732	245	13	61.8	3.3
Switzerland	109,894	108	8	99.3	7.4
Indiana	73,128,283	53,022	1,197	73.2	1.7

Source: Bernardin-Lochmueller & Associates, Inc. from INDOT data.

Note: * Per 100 million annual vehicle miles of travel.

As traffic volumes within the study area continue to increase, accidents rates would also be expected to increase. Every accident represents a risk to human safety, as well as costs incurred by motorists and government agencies. In turn, efforts to reduce accidents represent potential benefits to motorists, communities, and government agencies in the study area and in Indiana. Of particular concern is the frequency of fatal accidents within the study area. This indicates a critical need to reduce the number and severity of accidents throughout the study area.

■ 3.2 Address Perceptions of Inadequate Regional Accessibility and Connectivity

Initial review of the existing and future traffic volumes and volume to capacity (v/c) ratios indicate that there are no serious traffic capacity issues within the study area apart from limited roadway sections in Lawrenceburg, Madison and Versailles. However, due to a lack of north-south roadway connections in Switzerland and Ohio counties, the issues of accessibility and connectivity have been cited as major concerns in the study area. As ascertained through interviews with local officials and business representatives, as well as input from the SR 101 Advisory Committee, there is a *perception* that the SR 101 Study Area has inadequate transportation accessibility and connectivity to major metropolitan areas in the surrounding region.

A major factor influencing travel patterns within the study area is the location and number of Ohio River crossings. The 60-mile stretch of the Ohio River that forms the southeastern boundary of the study area is crossed by three bridges – at Madison, Markland, and Lawrenceburg. The Route 101 Markland Dam Bridge is about 30 miles downstream from Lawrenceburg and about 30 miles upstream from Madison.

The bridge at Madison carries about 10,000 vehicles per day (vpd), and the bridge at Markland Dam carries about 2,000 vpd. I-275, which crosses the Ohio River near Lawrenceburg, serves as a bypass route around greater Cincinnati area, and the U.S. 50/I-275 connector carries about 25,000 vpd. In Indiana, regional access to the Markland Dam Bridge is constrained because access is provided by SR 156, a two-lane rural minor arterial running along the Ohio River. Furthermore, there is no continuous north-south arterial route from the Markland Dam to U.S. 50 and onto I-74. In Kentucky, the Route 101 Markland Dam Bridge connects to U.S. 42 and is about 10.1 miles via U.S. 42 and KY 35 from I-71 in northern Kentucky. The I-71 to U.S. 42 Connector under construction in Kentucky will shorten the distance between the Markland Dam Bridge and I-71 to 7.4 miles.

The importance of regional connectivity of an arterial route from the Markland Dam to I-74 is heightened by I-74 Bypass Conceptual Feasibility Study presently being conducted by the Kentucky Transportation Cabinet. As discussed in Section 2.5, this study is exploring a freeway or limited-access controlled arterial from the Markland Dam Bridge to the new Maysville Bridge linking I-74 to I-71 and I-75 in northern Kentucky.

Internal to External Access

While travelers in the northern portion of the study area have adequate connections to I-74, travelers in the southern portion oriented toward I-71 in Kentucky are restricted to the Ohio River bridges at Madison, Markland, and Lawrenceburg. The Markland Dam Bridge will soon be only seven miles from I-71, which provides highway connections north toward Cincinnati and south toward Louisville. Improved access to the Markland Dam Bridge via a north-south roadway would provide better access from the region toward Kentucky, southern Ripley County, and Switzerland County.

Internal Circulation

East-west travel within the study area is generally more convenient than north-south travel. East-west route options, such as SR 56, SR 250, U.S. 50, SR 48 and I-74 serve the major towns in the region such as Madison, Rising Sun, Versailles, Aurora, Lawrenceburg and Batesville. Only U.S. 421 traverses the entire region in a north-south direction. While SR 129, SR 101 and SR 156/56 serve segments of north-south travel within the area, none

provide a continuous north-south connection. Improved north-south connectivity within the study area would improve internal accessibility.

Through Movements

Through travel movements – trips originating outside the region and destined to other points outside the region – are limited by the number of Ohio River crossings and the lack of major roadway facilities through the area. Through trips desiring to travel between the Indianapolis area and northern Kentucky would choose either I-74 to the I-275 bridge crossing in Lawrenceburg or a combination of I-65 and SR 256 to reach Madison and cross the U.S. 421 bridge into Kentucky. While the Markland Dam Bridge also provides access into northern Kentucky, there is no convenient route connecting it to the larger southeastern Indiana area. There is a need to connect the Markland Dam bridge to a north-south roadway to provide better access through the region from Kentucky, southern Ripley County, and Switzerland County.

3.2.1 Personal Accessibility

The recent draft Purpose and Need Statement prepared for the I-69 Evansville-to-Indianapolis Study's Tier 1 Environmental Impact Statement[1] documents an analysis of personal accessibility for the entire state of Indiana. As defined in the I-69 Study's Purpose and Need Statement, "the concept of personal accessibility refers to the ease with which residents of a particular region can travel to population and employment centers and other types of attractions (e.g., health facilities, educational institutions, airports, and cultural events). Generally, a region that is well-connected internally and externally to common travel destinations will have a high degree of accessibility." Although the focus of the I-69 effort is on the southwestern portion of the state, the assessment covered the entire state and equally relevant information on accessibility was developed for southeastern Indiana and the SR 101 study area.

To perform this assessment, the I-69 study team utilized the Indiana Statewide Travel Demand Model. (The southeastern portion of this model was refined for analysis of travel behavior in the SR 101 study area.) This travel model includes substantial portions of the States of Kentucky, Illinois, Michigan, and Ohio and therefore accounts for the accessibility of

[1] Bernardin, Lochmueller & Associates, Inc., I-69 Evansville-to-Indianapolis Study Tier 1 Environmental Impact Statement, Draft Purpose and Need Statement, Prepared for the Indiana Department of Transportation, April 17, 2001.

areas along the state border to attractions such as employment and airports in neighboring states.

Detailed documentation of the analysis approach is provided in the draft I-69 Purpose and Need Statement. In summary, each traffic analysis zone (TAZ) in the model was assigned an "attractive force" (AF) rating where the higher the accessibility rating, the stronger the attraction of that TAZ as a destination for a particular type of travel – e.g., travel to urban areas, to airports, etc. The travel demand model calculates congested travel time between each TAZ and all other TAZ's in the state and then takes into account actual travel behavior in terms of an impedance factor that accounts for drivers' willingness to travel given alternative distances to destinations. This is then used to calculate an "accessibility index." The index for each TAZ is determined by calculating the ratio of attractive force to travel time between that TAZ and each other TAZ, and then calculating the sum of those ratios. The accessibility index for a TAZ will tend to be high (or more accessible) if the TAZ has short travel times to a large number of TAZ's with high attractive force ratings or low if the TAZ is surrounded by other TAZ's with low attractive force ratings or long travel times to TAZ's with higher attractive force ratings.

Using this methodology, the I-69 study team developed accessibility index measures for various single types of attractions. The relevant measures for the SR 101 study area included:

- Accessibility to Populations Centers (based on total population within each traffic analysis zone);
- Accessibility to Employment;
- Accessibility to Urban Areas (over 50,000 population);
- Accessibility to Major Airports; and
- Accessibility to Institutions of Higher Education.

The following pages present the figures and findings of the accessibility analysis as presented in the draft I-69 Purpose and Need Statement. The findings relevant to the SR 101 study area can be summarized as follows:

Accessibility to Populations Centers (Figure 3.3). The SR 101 Study area is less accessible than approximately 60 percent of the state of Indiana. Parts of Switzerland County are among the least accessible areas of the state in 1998. Accessibility to these areas improves slightly in 2025.

Accessibility to Employment (Figure 3.4). The SR 101 Study area is less accessible than approximately 60 percent of the state of Indiana. Parts of Switzerland County are among the least accessible areas of the state in 1998. Accessibility to these areas improves slightly in 2025.

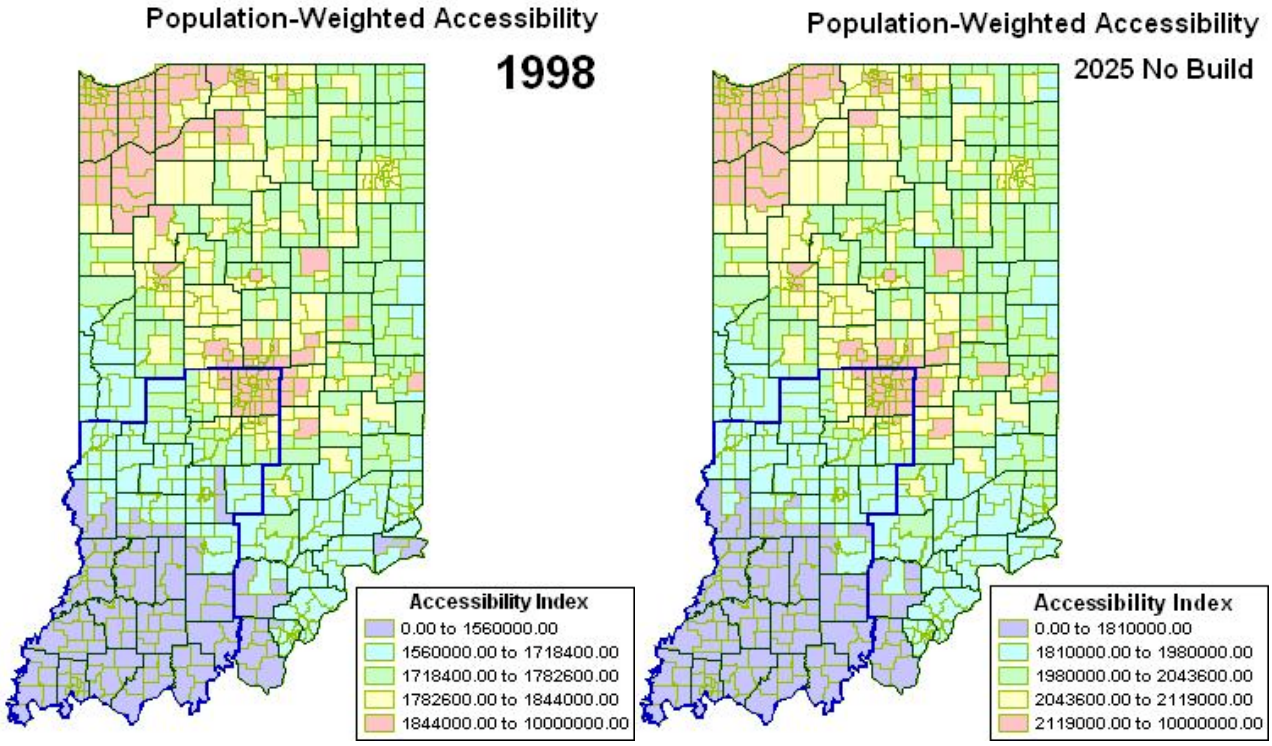
Accessibility to Urban Areas (Figure 3.5). The SR 101 Study area is less accessible than approximately 60 percent of the state of Indiana. Parts of Switzerland County are among the least accessible areas of the state in 1998 and remain among the least accessible areas in 2025.

Accessibility to Major Airports (Figure 3.6). The SR 101 Study area is less accessible than approximately 60 percent of the state of Indiana. Accessibility to these areas improves slightly in 2025.

Accessibility to Institutions of Higher Education (Figure 3.7). The SR 101 Study area is less accessible than approximately 60 percent of the state of Indiana. Switzerland and Ohio Counties are among the least accessible areas of the state in 1998 and remain among the least accessible areas in 2025.

This analysis of regional accessibility substantiates local perceptions that regional accessibility is limited for at least some travel purposes, specifically travel to urban areas and institutions of higher learning. Limited accessibility to urban areas can affect local development opportunities due to higher travel times to these areas than from other locations in Indiana. Higher travel times can result in comparatively higher transportation costs to key economic activity centers such as urban areas.

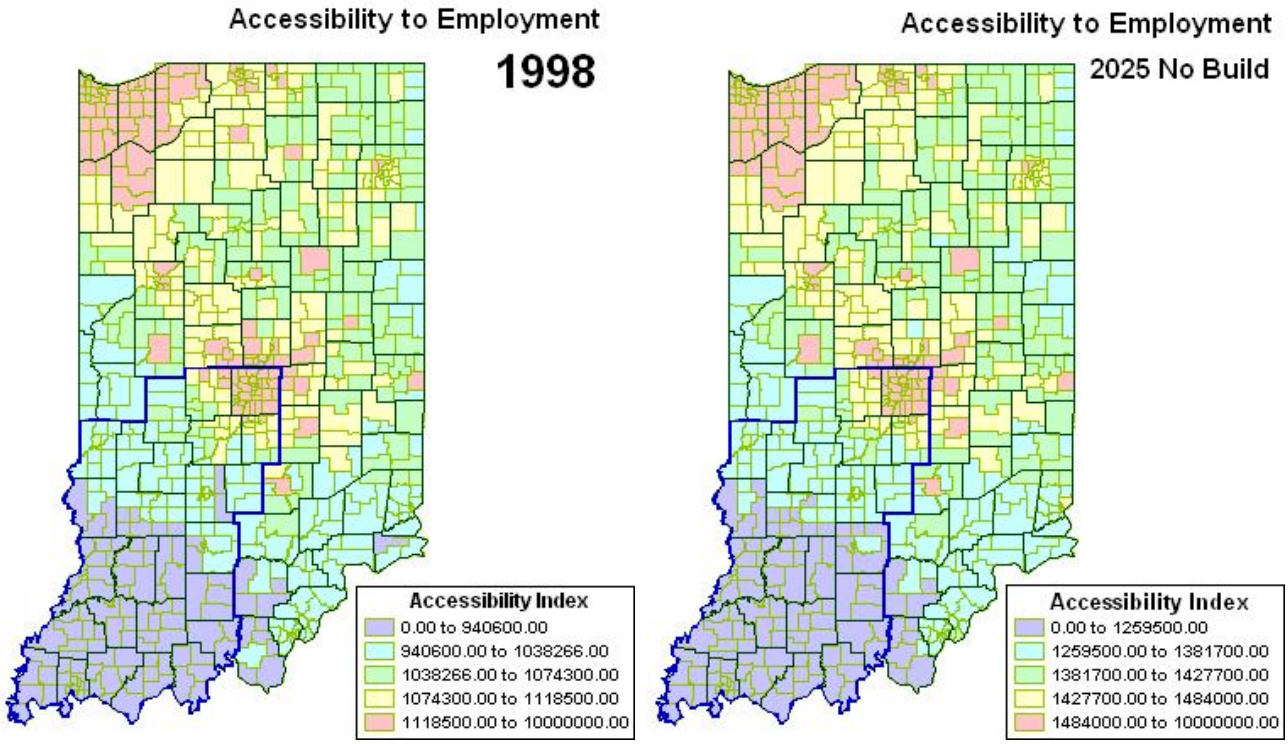
Figure 3.3 Indiana Accessibility to Population Centers



The color coding above shows the ranges of Accessibility to Population indices for Traffic Analysis Zones (TAZ) in the Indiana Statewide Travel Demand Model. Attraction to each TAZ was based on the total population in that TAZ. The higher the index, the greater accessibility a TAZ has to population in other TAZs. The color coding groups TAZs by 20 percent ranges, corresponding to the value of their accessibility indices. The bottom 20 percent of TAZs (the ones with the poorest population-weighted accessibility) are shown in blue, and the top 20 percent of TAZs (the ones with the best population-weighted accessibility) are shown in pink-violet.

These indices are calculated considering the access which each TAZ has to other zones both within and outside of Indiana. Outside of Indiana, zones in Illinois, Kentucky, Ohio, and Michigan are included in accessibility index calculations. The formula to calculate the accessibility index is as given above, where AF is the population of each TAZ.

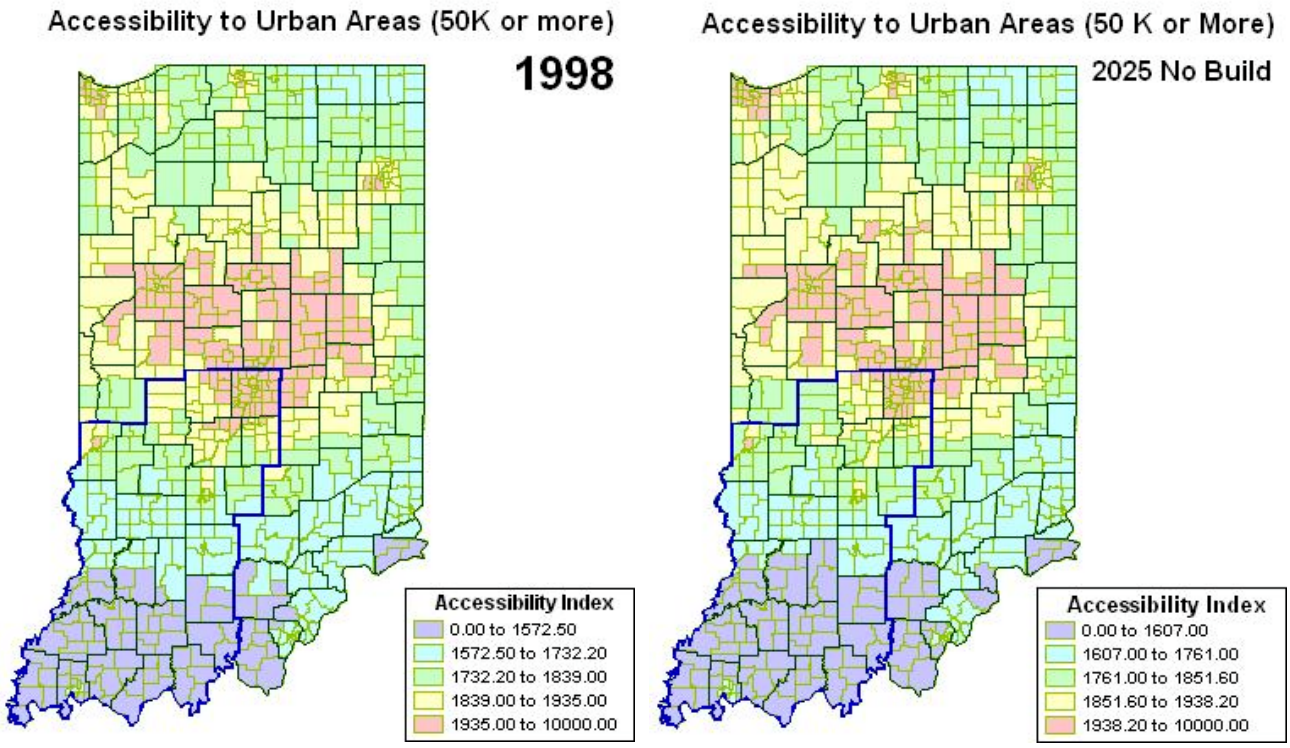
Figure 3.4 Indiana Accessibility to Employment



The color coding above shows the ranges of Accessibility to Employment indices for Traffic Analysis Zones (TAZ) in the Indiana Statewide Travel Demand Model. The higher the index, the greater accessibility a TAZ has to employment in other TAZs. The color coding groups TAZs by 20 percent ranges, corresponding to the value of their accessibility indices. The bottom 20 percent of TAZs (the ones with the poorest accessibility to employment) are shown in blue, and the top 20 percent of TAZs (the ones with the best accessibility to employment) are shown in pink-violet.

These indices are calculated considering the access which each TAZ has to other zones both within and outside of Indiana. Outside of Indiana, zones in Illinois, Kentucky, Ohio, and Michigan are included in accessibility index calculations. The formula to calculate the accessibility index is as given above, where AF is the number of jobs located in each TAZ.

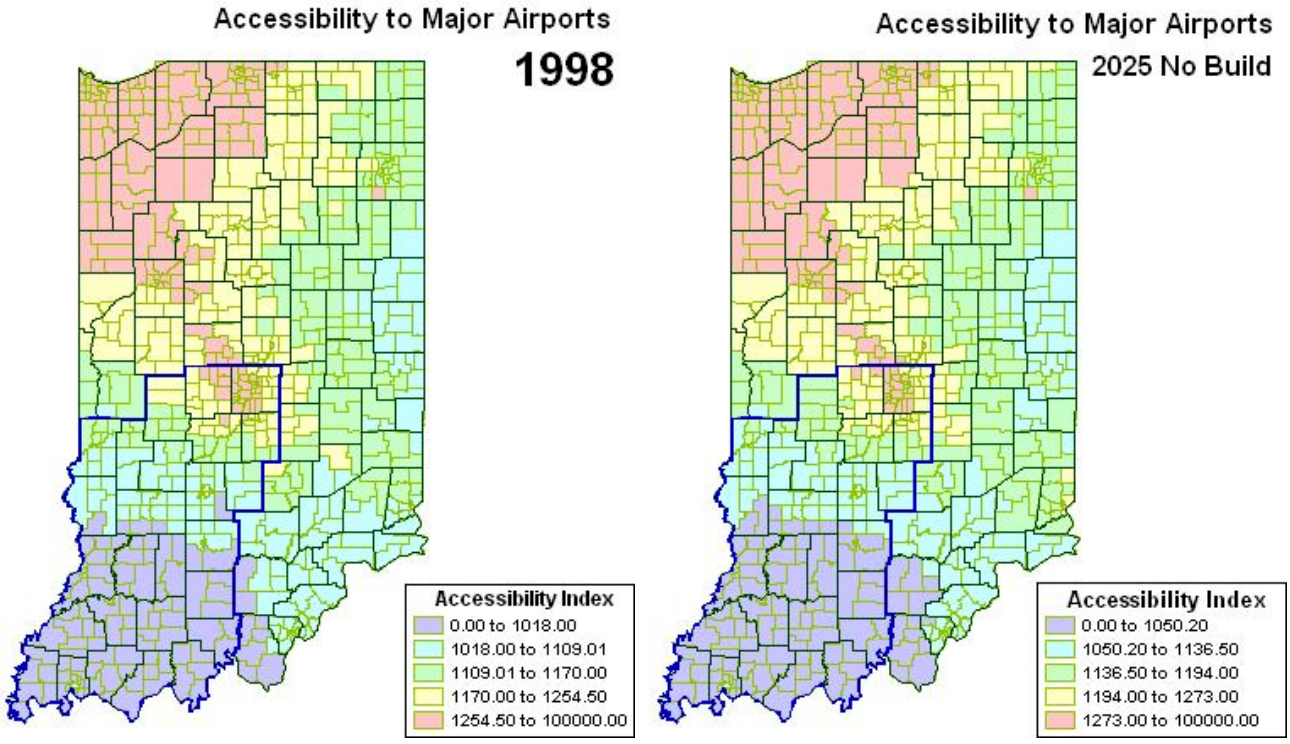
Figure 3.5 Indiana Accessibility to Urban Areas



The color coding above shows the ranges of Accessibility to Urban Area indices for Traffic Analysis Zones (TAZ) in the Indiana Statewide Travel Demand Model. The analysis was based on relative accessibility to the central business district (CBD) for urban areas of at least 50,000 population. The higher the index, the greater accessibility a TAZ has to urban areas of at least 50,000 population in other TAZs. The color coding groups TAZs by 20 percent ranges, corresponding to the value of their accessibility indices. The bottom 20 percent of TAZs (the ones with the poorest accessibility to urban areas) are shown in blue, and the top 20 percent of TAZs (the ones with the best accessibility to urban areas) are shown in pink-violet.

These indices are calculated considering the access which each TAZ has to other zones both within and outside of Indiana. Outside of Indiana, zones in Illinois, Kentucky, Ohio, and Michigan are included in accessibility index calculations. The formula to calculate the accessibility index is as given above, where AF is equal to 1 for a single TAZ in the downtown of each major urban area, and 0 for any other TAZ. A major urban area is a city (including surrounding communities) with a population of at least 50,000.

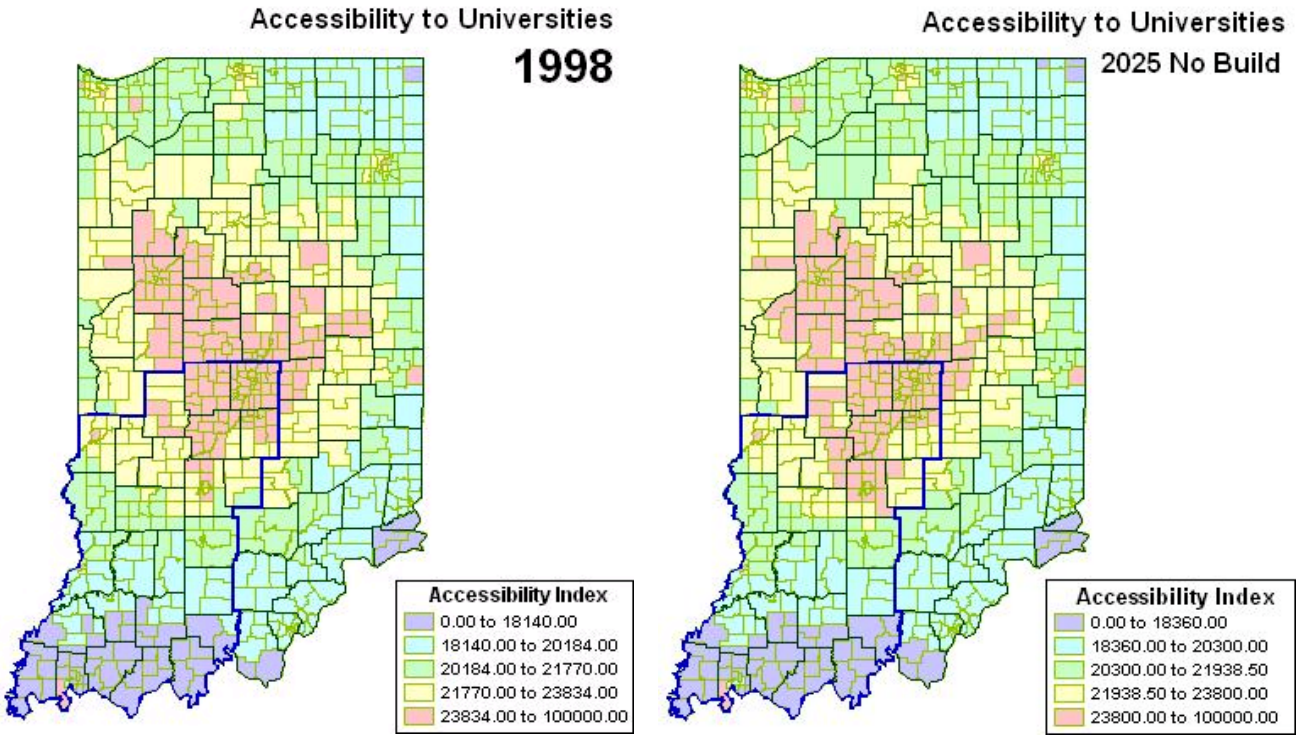
Figure 3.6 Indiana Accessibility to Major Airports



The color coding above shows the ranges of Accessibility to Major Airports indices for Traffic Analysis Zones (TAZ) in the Indiana Statewide Travel Demand Model. The higher the index, the greater accessibility a TAZ has to major airports in other TAZs. The color coding groups TAZs by 20 percent ranges, corresponding to the value of their accessibility indices. The bottom 20 percent of TAZs (the ones with the poorest accessibility to major airports) are shown in blue, and the top 20 percent of TAZs (the ones with the best accessibility to major airports) are shown in pink-violet.

These indices are calculated considering the access which each TAZ has to other zones both within and outside of Indiana. Outside of Indiana, zones in Illinois, Kentucky, Ohio, and Michigan are included in accessibility index calculations. The formula to calculate the accessibility index is as given above, where AF is the annual air-passenger enplanements in each TAZ.

Figure 3.7 Indiana Accessibility to Institutions of Higher Education



The color coding above shows the ranges of Accessibility to Institutions of Higher Education for Traffic Analysis Zones (TAZ) in the Indiana Statewide Travel Demand Model. The higher the index, the greater accessibility a TAZ has to institutions of higher education in other TAZs. The color coding groups TAZs by 20 percent ranges, corresponding to the value of their accessibility indices. The bottom 20 percent of TAZs (the ones with the poorest accessibility to institutions of higher education) are shown in blue, and the top 20 percent of TAZs (the ones with the best accessibility to institutions of higher education) are shown in pink-violet.

These indices are calculated considering the access which each TAZ has to other zones both within and outside of Indiana. Outside of Indiana, zones in Illinois, Kentucky, Ohio, and Michigan are included in accessibility index calculations. The formula to calculate the accessibility index is as given above, where AF is the number of students enrolled in institutions of higher education which have enrollments of at least 2,500.

3.2.2 Shortest Path Analysis

As a further assessment of accessibility in the SR 101 Study Area, the SR 101 Study Area travel demand model was used to evaluate the efficiency of existing transportation linkages within the study area. These linkages were assessed both in terms of travel time and travel distance based on the existing (1998) and future (2025) transportation networks. Comparisons were made of travel via an "ideal" or straight-line path versus travel on the available highway network. Given its importance as an Ohio River crossing and its direct connectivity to I-71 in Kentucky (following completion of the I-71 connector), Markland Dam was considered a key trip terminus. From Markland Dam, travel time and distance was assessed to the nearest interchanges on U.S. 50 (Dillsboro) and I-74 (Saint Leon) as well as to Versailles. The trip between Vevay and Batesville, population centers at the northernmost and southernmost extremes of the study area, was also assessed.

Travel Distance

A straight line was drawn between locations within the SR 101 study area which would represent likely trips by private auto and commercial vehicles. This straight-line or ideal distance was then compared to the actual highway distance by the quickest existing route based on the absolute difference in mileage and the ratio of straight-line mileage to actual mileage. The results of this comparison are shown in Tables 3.4 and 3.5. As indicated, the discrepancy between actual and ideal travel distance is significantly higher for all trips to Markland Dam than between Vevay and Batesville at the northernmost and southernmost extremes of the study area.

Table 3.4 Comparison of Actual-to-Ideal Highway Distance
1998

	Distance		Mileage Difference	Mileage Linkage Index
	Shortest Path	Straight-line	Actual Versus Ideal	Actual Versus Ideal
Markland Dam – U.S. 50 at Dillsboro	35.82	17.01	18.81	0.47
Markland Dam – I-74 at Saint Leon	52.98	34.17	18.81	0.64
Markland Dam - Versailles	34.71	25.08	9.63	0.72
Vevay – Batesville	48.74	39.70	9.04	0.81

Table 3.5 Comparison of Actual-to-Ideal Highway Distance
2025

	Distance		Mileage Difference	Mileage Linkage Index
	Shortest Path	Straight-line	Actual Versus Ideal	Actual Versus Ideal
Markland Dam – U.S. 50 at Dillsboro	35.75	17.01	18.74	0.48
Markland Dam – I-74 at Saint Leon	53.28	34.17	19.11	0.64
Markland Dam - Versailles	34.71	25.08	9.63	0.72
Vevay – Batesville	48.74	39.70	9.04	0.81

Travel Time

Similar to the analysis of travel distance, to assess travel time efficiency, a straight line was drawn between the same locations within the SR 101 study area. In this case, travel speed was assumed to be equal to the average network travel speed as calculated by the SR 101 travel demand model for a rural major arterial roadway within the study area for each analysis year. This straight-line or ideal travel time was then compared to the actual highway travel time by the quickest existing route based on the absolute difference in travel time and the ratio of straight-line travel time to actual travel time. The results of this comparison are shown in Tables 3.6 and 3.7. As indicated, consistent with the findings of the travel distance analysis, the discrepancy between actual and ideal travel distance is significantly higher for all trips to Markland Dam than between Vevay and Batesville at the northernmost and southernmost extremes of the study area.

Table 3.6 Comparison of Actual-to-Ideal Travel Time
1998

	Travel Time (Minutes)		Travel Time Difference	Travel Time Linkage Index
	Shortest Path	Straight-line	Actual Versus Ideal	Actual Versus Ideal
Markland Dam – U.S. 50 at Dillsboro	43.25	18.11	25.14	0.42
Markland Dam – I-74 at Saint Leon	61.82	36.40	25.42	0.59
Markland Dam – Versailles	40.63	26.70	13.93	0.66
Vevay – Batesville	55.15	42.26	12.89	0.77

Table 3.7 Comparison of Actual-to-Ideal Travel Time
2025

	Travel Time (Minutes)		Travel Time Difference	Travel Time Linkage Index
	Shortest Path	Straight-line	Actual Versus Ideal	Actual Versus Ideal
Markland Dam – U.S. 50 at Dillsboro	43.25	18.89	24.36	0.44
Markland Dam – I-74 at Saint Leon	62.22	37.97	24.25	0.61
Markland Dam - Versailles	40.63	27.85	12.78	0.69
Vevay – Batesville	55.15	44.08	11.07	0.80

4.0 Next Steps and Analysis of Alternatives

4.1 Next Steps

As discussed in the preceding sections, initial needs identified for the SR 101 Corridor include the following:

- Improve roadway safety and reduce accident frequency in the study area; and
- Address perceptions of inadequate regional accessibility and connectivity, and if perceptions prove valid, improve regional accessibility and connectivity.

In order to address these needs, the next steps in the study process will include the following activities:

- Develop an initial inventory of alternatives to address the needs of the study corridor. Conduct a screening of these alternatives in conjunction with INDOT and the SR 101 Advisory Committee to identify two to three alternatives for detailed analysis.
- Conduct detailed analysis of alternatives, including analysis of transportation and economic impacts. Identify preferred alternative(s).

4.2 Analysis of Alternatives: Application of Performance Measures

Performance measures, described below, have been identified to help assess the ability of each alternative to meet the study area's needs. Detailed analysis of the SR 101 alternatives and identification of a preferred alternative will involve assessment of how effectively each alternative is able to address these performance measures.

Roadway Safety

The ability of proposed improvement alternatives in the SR 101 study area to improve roadway safety conditions and reduce accident frequency will be assessed using the User Benefit-Cost Analysis System (NET_BC) incorporated into the MCIBAS system (discussed in Section 2.0). NET_BC calculates the overall value of travel time, travel cost, and travel safety benefits associated with the implementation of a major highway improvement, compared to a base case in which the project is not built. The specific performance measure which will be used to assess the feasibility of alternatives to improve roadway safety conditions will be:

- Dollar value of safety benefits by trip purpose (as calculated through NET_BC).

Regional Accessibility and Connectivity

The ability of proposed improvement alternatives in the SR 101 study area to improve regional accessibility in terms of travel distances and travel times will be assessed using the SR 101 Study Area Travel Demand Model. This assessment will include analysis of regional vehicle miles of travel, travel speeds, and travel delay, compared to a base case in which the project is not built. The benefits of proposed alternatives to the regional economy will be assessed in conjunction with the transportation benefits of improved accessibility.

Specific performance measures which will be applied in the analysis of alternatives to assess improved accessibility will be:

- Changes in Vehicle Miles of Travel (VMT);
- Changes in Vehicle Hours of Travel (VHT);
- VMT by functional roadway class; and
- VHT by functional roadway class.

Performance measures which will be applied to assess the economic benefits of each alternative will be:

- Net change in employment; and
- Net change in disposable income.

Appendix A

Response to Comments

Memorandum

TO: Steve Smith, Indiana Department of Transportation

FROM: Samuel Lawton

DATE: December 24, 2001

RE: Proposed Response to Comments on SR 101 Draft Purpose and Need Statement from Virginia Laszewski, EPA – Region 5 (Interagency Review Meeting on November 15, 2001)

The following is a summary of comments made at the Interagency Review Meeting on November 15, 2001 by Virginia Laszewski, EPA – Region 5 and proposed modifications to the Purpose and Need Statement in response. No other comments were received from Resource Agencies requiring a response at this time.

Comment: Accident data in Tables 3.1 and 3.2 shows injuries and fatalities for the study area roadways from 1996 to 1998. Injury and fatality rates are averaged over this three-year period but these rates are compared to Indiana statewide data for 1998 only. EPA feels that this could "skew the findings."

Response: Statewide accident data for 1996 to 1998 has been obtained from INDOT and will be reported to provide consistent data.

Comment: EPA expressed difficulty in understanding the accessibility indices shown in Figures 3.3 to 3.7 and asked if were possible to show actual travel times or vehicle miles of travel, rather than "indices." EPA asked if this analysis would be rerun to show the impact of the proposed alternatives.

Response: The accessibility indices reported in the Purpose and Need Statement were obtained from the I-69 EIS effort. The indices are intended to show a comparison of accessibility through rankings of accessibility by traffic analysis zone. There is no single measure of travel time or vehicle miles of travel because the indices are based on travel times and distances to multiple zones. Therefore a single measure of time or distance cannot be computed. A more detailed explanation of the calculation of the indices is provided in the Task 3.3.4 Technical Report – Regional Transportation Needs Analysis for the I-69 EIS.

150 CambridgePark Drive ■ Suite 4000 ■ Cambridge, MA 02140
t 617 354 0167 ■ f 617 354 1542

Comment: EPA felt clear standards needed to be applied to define *acceptable* travel time.

Response: There is no reasonable standard that can be defined for acceptable travel time because what is considered acceptable will vary depending upon trip purpose and location of travel. No standards can be provided as a benchmark in the Purpose and Need Statement.

Comment: EPA stated that if economic development is a "need" within the study area that it should be explicitly stated as such in the Purpose and Need Statement.

Response: The Purpose and Need as currently defined for the SR 101 Feasibility Study is improved safety and accessibility. Economic development is recognized as a potential benefit which could accrue through transportation improvements but is not a primary objective as expressed in the Purpose and Need Statement.

Comment: Relevant to performance measures, EPA expressed concern that safety benefits would be expressed in terms of dollars saved as calculated through the MCIBAS system. EPA would like a more precise measure of actual numbers of accidents reduced.

Response: MCIBAS can be used in the initial assessment of alternatives to identify the most promising alternatives to reduce accident frequency. Specific design alternatives will need to be developed during a subsequent stage of study if specific improvement options are found to be feasible. At that stage, accident reduction factors can be applied relevant to specific roadway enhancements to quantify accident reduction potential. No change will be made to performance measures at this stage of analysis.

Comment: SR 101 designation for the Markland Dam bridge should be shown on study area maps.

Response: SR 101 designation for Markland Dam bridge will be shown on maps in future documents.

Comment: Page 2-2 refers to the town of French. The location of French should be shown on study area maps.

Response: Reference to the town of French will be deleted from text.

Comment: Page 2-2 refers to SR 7. The location of SR 7 should be noted on study area maps.

Response: Reference to SR 7 will be deleted from text. The area mentioned in the review draft of the Purpose and Need Statement falls outside of SR 101 study area.

Comment: Page 2-3 refers to truck activity in the study area but does not quantify truck volumes. More detail is desirable.

Response: The general magnitude of truck movements in the study area can be estimated based on percentage of overall traffic flow as provided in Purpose and Need Statement. Improved accommodation of truck movements is a benefit of improved accessibility. Future

travel demand model runs will be used to quantify future truck volumes. More precise quantification will be reported in technical memoranda.

Comment: Secondary and cumulative impacts of alternatives on the environment such as air quality and water quality should also be assessed.

Response: These impacts would be assessed in the EIS phase based on a more detailed definition of alternatives.

Comment: Clarification should be made of the difference between population centers (page 3-11) and urban areas (page 3-13).

Response: Clarification will be provided based on the explanation provided on page 3.11 in the Task 3.3.4 Technical Report – Regional Transportation Needs Analysis for the I-69 EIS.

Comment: Route numbers are shown in Table 3.4 (page 3-16) for Dillsboro and Saint Leon but not in the description of locations for Versailles and Batesville (last two lines of table).

Response: The text of the Purpose and Need statement explains the rationale for indicating route numbers for Dillsboro and Saint Leon locations. Versailles and Batesville measurement locations are assumed to be the town centers.

Comment: Relevant to discussion of performance measures in Section 4.0, EPA would like clarification of what performance levels are considered adequate as target thresholds.

Response: Target thresholds and perceptions of "adequacy" vary by travel purpose and geographic location. For this feasibility study, performance measures will be assessed comparatively and ranked to determine most feasible alternatives for more detailed assessment. Specific thresholds to define adequacy will not be quantified.

Comment: EPA also wants analysis of "environmental impacts" mentioned in the last bullet on page 4-1.

Response: Environmental impacts at this stage of feasibility analysis will be based on secondary sources, consistent with the study's scope of work. More detailed environmental analysis will be conducted in later phases if a specific project is identified as feasible for further study.